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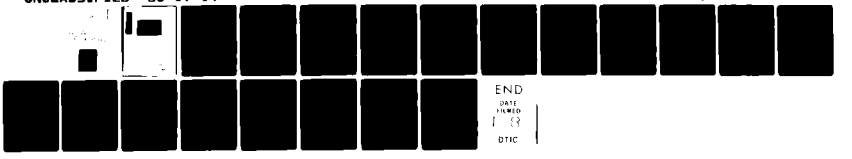

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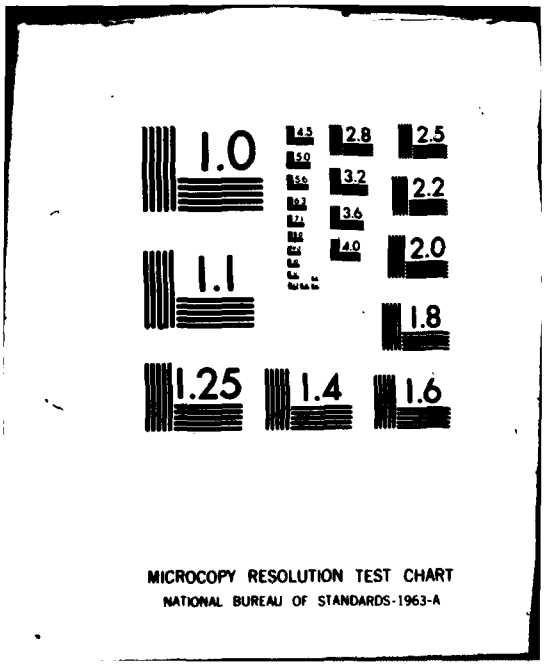
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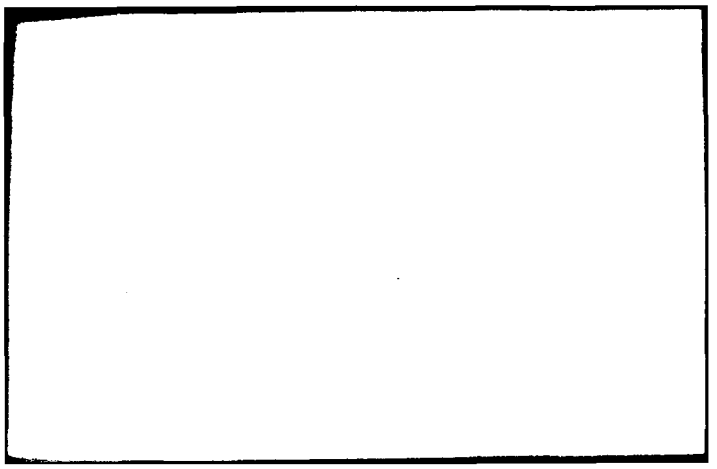

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THE FLAT-FILE ALERTER SYSTEM

Rishiyur Nikhil

80-07-04

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The flat-file alerter system allows one to monitor a flat file for various conditions of interest. A flat file is a sequential file of fixed-length records of identical format. In addition, the file is keyed on a specific field, and sorted on that key. Thus the addition of records (appearance of records with keys that did not exist before), deletion of records (disappearance of keys that existed before), and modification of records (modification of a field other than the key in a record) can be surveyed.

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The Flat-file Alerter System allows one to monitor a flat file for various conditions of interest. A flat file is a sequential file of fixed-length records of identical format. In addition, the file is keyed on a specific field, and sorted on that key. Thus we can talk about addition of records (appearance of records with keys that did not exist before), deletion of records (disappearance of keys that existed before) and modification of records (modification of a field other than the key in a record).

Some examples of conditions that the system can recognise are:

Addition of a record with NAME = 'NIKHIL'.

Deletion of a record with PROGRAM = 'FORTRAN' and NAME = 'JONES'.

Modification of a record with OLD BAL > 200 and NEW BAL < 200.

To elaborate,

1. the system allows you to specify 'Alerters'. Each alerter consists of

    1. an ALERTER NAME, by which it is uniquely identified,

    2. an ALERTER TYPE, specifying whether the condition is to be applied to added records, modified records or deleted records,

    3. a CONDITION, similar to those in the example above, and

    4. a REPORTLIST, which is a list of fieldnames and literals, the values of which are to be reported when the condition becomes true.

2. it monitors the flat file for the conditions specified in the alerters. When an alerter's CONDITION becomes true, an alert message is typed out on the terminal, with the values of the literals and fieldnames specified in the REPORTLIST in the alerter.

These two functions are accomplished by the two programs MESGPR and WATCH, which will be described separately.

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Data Files

The system uses these files during operation:

FLTFIL.INF: this is the file which tells the system about the flat file to be monitored, and must be prepared before using MESGPR or WATCH (can be prepared using an editor). It must contain the following information:

```
Line  1:
     device filename.ext    project-programmer-number
      A5      A10        1X  O4    ,   O4
Line  2:
     name of field on which the field is keyed
      A16
Lines 3....(max 20 lines) :
     fieldname    data-type    format    field-length
      A16      1X   A1      1X  A16   1X  I6
```

Here is an example of such a file:

```
DSKB:SYSFIL.DAT 2651, 102
JOB-NUM
JOB-NUM          I     I3,
NAME             C  1X,A4,A2,        6
NAME2            C  1X,A4,A2,        6
TTY              I  1X,I8,
PROGRAM          C  1X,A4,A2,        6
PROJ-NUM         I  1X,I6,
PROG-NUM         I  1X,I6
```

Where "data-type" is "I" for integer, "C" for alpha-numeric and "R" for real. "format" descriptors correspond to the format in which the record is read, assuming four characters/word (i.e. a character field of width 23 would have 5(A4),A3). Note that the field-length is needed only for character fields.

DATSTR.ALT: this file, created by MESGPR (read/write) and used by WATCH (read), holds a record of all alerters currently defined. Thus alerters are remembered from one session to the next.

FILOLD.TMP,FILTMP.TMP: these are temporary "workspace" files used by WATCH while running, and may be deleted if necessary.

MESGPR

MESGPR is an interactive program that allows you to define new alerters, and delete existing alerters. Alerters are stored in a 'database of alerters' (file called DATSTR.ALT). MESGPR also allows you to deactivate (i.e. retain the alerter definition in the database, but do not act on them) and reactivate alerters.

MESGPR is run by typing, at monitor level,

```
.RUN MESGPR
```

At ANY time, at ANY prompt, you can ask for help by typing question marks. The number of question marks typed will determine the verbosity of the help given- i.e. '?' will give you terse help, while '????' might pontificate. If the help message thus typed is of maximum verbosity, the message

```
NO MORE VERBOSITY AVAILABLE AT THIS POINT
```

will be typed at the end of the help message.

When you enter MESGPR, the following message will be typed:

```
Welcome to the Flat-File monitor !
Do you need help ? (?/N) :
```

If you want help, type '?', else type 'n' or 'N'. This will bring you to the top level prompt:

A / C / D / H :

to which you can reply according to what you want done.

At ANY time, at ANY level, you can ALWAYS abort back to this top-level prompt by typing '<carriage-return>@<carriage-return>' (i.e. an '@' in the first column).

These are the four ways you can go in response to the top-level prompt:

Adding an Alerter

You can define a new alerter by replying 'A', or 'ADDALERT' to the top-level prompt.

It will then prompt you with 'Alerter name ? :'. Type in an alphanumeric identifier- only the first 16 characters are considered.

It will the prompt you with 'IFA/IFM/IFD ? :'. Type in

IFA, or IFADD, if this alerter is concerned with the addition of records to the system tables,

IFM, or IFMOD, if this alerter is concerned with the modification of records in the system tables,

IFD, or IFDEL, if this alerter is concerned with the deletion of records in the system tables.

It will then prompt you with 'Condition ? :'. Type in a prefix-Polish expression on fieldnames and literals. Operators available are:

```
AND - binary boolean and,
OR  - binary logical or,
EQ  - binary integer/string equality,
NE  - binary integer/string inequality,
GT  - binary integer/string 'greater than',
LT  - binary integer/string 'less than',
PLUS- binary integer addition,
NOT - unary boolean 'not',
NEG - unary integer negation.
```

Fieldnames available are those specified in the configuration file FLTFIL.INF. You can get a listing of these fields by asking for help. Fieldnames may be preceded by 'NEW' or 'OLD', referring to the values of the field before and after modification. Literals may be integers, or character strings enclosed in quotes.

It will then prompt you with 'Reportlist ? :'. Type in a sequence of literals and fieldnames, the values of which you wish reported if the alerter triggers (CONDITION becomes true). You may use as many lines as you wish. End the list by typing '<carriage-return>#<carriage-return>' (i.e. a '#' in the first column).

It will finally ask you to confirm all of the above with 'Confirm (Y/@) :', giving you a chance to chicken out (by typing '@'), or add the alerter just defined to the database (by typing 'Y').

It will then go back to the top-level prompt.

Deleting, Deactivating, Reactivating Alerters

You can delete, reactivate, and deactivate alerters by replying 'C', or 'CHANGESTATUS' to the top-level prompt. It will then prompt you with 'Option ? :'. Type in

DEL1, to delete a single alerter,

DEACT1, to deactivate a single alerter,

REACT1, to reactivate a single alerter,

DELALL, to delete all alerters,

DEACTALL, to deactivate all alerters,

REACTALL, to reactivate all alerters.

In the first three cases (single alerter), it will then prompt you with 'Alerter name ? :'. Type in the name of the alerter you want deleted, deactivated or reactivated. It will ask you to confirm the above with 'Confirm (Y/@) :', giving you a chance to chicken out (by typing '@'), or update the database accordingly (by typing 'Y').

When done, it will prompt you again with the top-level prompt.

Displaying an Alerter

You can display an alerter by replying 'D', or 'DISPLAY' to the top-level prompt.
It will then prompt you with 'Alerter name ? :'. Type in the name of the alerter you want displayed. It will display the ALERTER TYPE, STATUS, CONDITION and REPORTLIST of the specified alerter.
In the special case that you type in 'ALL', instead of an alerter name, it will just display the ALERTER NAMEs of all alerters in the database.
When done, it will again prompt you with the top-level prompt.

Exitting from MESGPR

You can exit cleanly from MESGPR by replying 'H', or 'HALT', or with a Control-C to the top-level prompt.

WATCH

WATCH is the program that monitors the system tables according to the alerters that have been stored in the database (DATSTR.ALT) by the the MESGPR program.

To run WATCH, type, at monitor level,

.RUN WATCH

It will prompt you with

ENTER FREQUENCY OF CHECKING (INTEGER SECONDS) :

This number refers to the frequency with which WATCH looks at the system tables for changes. Note that it cannot detect changes that do not last for this duration (e.g. a person starts running a different program, then comes back to his/her original program before WATCH got a chance to notice it). Type in an integer.

It will then prompt you with

TOTAL MONITORING TIME ? (INTEGER MINUTES):

This number refers to the duration for which WATCH is to run, before returning to monitor level (of course, you could always interrupt it in between by typing in Control-Cs). Type in an integer.

WATCH will then go off and watch the system tables according to the active alerters in the database. Every time a CONDITION becomes true, an alert message is typed on the terminal. This includes the alerter name, the current time, and the values of fields in the record which triggerred the condition, and the literals, as specified in the reportlist of the alerter.

Finally, after the total monitoring time has elapsed, WATCH exits, and returns to monitor level.

EXAMPLES

In these examples, the file SYSFIL is assumed. This is a file that the operating system maintains, and contains information on all jobs on the system (job-number, who is logged in, what they are running, etc). The description of this file is given in the section on Data Files, FLTFIL.INF.

This is an example of a session with MESGPR, during which an alerter ANY-CHANGE is set, which is meant to detect the event when anyone on the system starts running a different program. Monitor and MESGPR prompts are shown as is; user responses are underlined.

```
.run mesgpr[2651,102]

Welcome to Flat-File monitor !
Do you need help ? (?/N) :n

  1 Alerter(s) in database .
#

A / C / D / H :d

Alerter name ? :?

Specify name of alerter you want displayed.
Type 'ALL' to display all alerter names.

Alerter  name ? :all

!Existing Alerts :-
     JONES-LOGIN
#
```

```
A / D / C / H :d

Option ? :dell

Alerter name ?  :jones-login

!Deleted JONES-LOGIN
#

Confirm (Y/@) :y

  0 Alerter(s) in database .
#

A / C / D / H :a

Alerter name ?  :any-change

IFA/IFM/IFD ? :ifm

Condition ?  :
ne new program old program

Reportlist ? :
name 'has just started running' program 'on terminal' tty
#

!ADDED ANY-CHANGE
#

Confirm (Y/@) :y

  1 Alerter(s) in database .
#

A / C / D / H :d

Alerter name ? :any-change

 Status :   ACTIVE        Type : IFM
 Condition :
     NE
```

```
          NEW PROGRAM
          OLD PROGRAM
 Reportlist :
NAME
'has just started running'
PROGRAM
'on terminal '
TTY
#


A / C / D / H :h


Terminating session, saving all alerts...
#

STOP

END OF EXECUTION
CPU TIME: 0.54  ELAPSED TIME: 17.63
EXIT


.
```

This is an example of a session with WATCH; it is configured to check the system tables every 5 seconds, and run for a total duration of 10 minutes.

```
.run watch[2651,102]

ENTER FREQUENCY OF CHECKING (INTEGER SECONDS) :5

TOTAL MONITORING TIME ? (INTEGER MINUTES):10
!ANY-CHANGE         TRIGGERRED AT 19:24 33.7 ON  17-Jun-79
MILLER has just started running PIP on terminal 144
#
!ANY-CHANGE         TRIGGERRED AT 19:28 42.8 ON  17-Jun-79
NIKHIL has just started running TECO on terminal 40
#

!Flat file monitoring time up. Stopping....
STOP

END OF EXECUTION
CPU TIME: 31.39 ELAPSED TIME: 6:12.12
EXIT
```

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